# MAT 230 Exam Two

**General:**

* Before beginning this homework, be sure to read the textbook sections and the material in Learning Modules Five through Eight.
* Type your solutions into this document and be sure to show all steps for arriving at your solution. Just giving a final number may not receive full credit.
* You may copy and paste mathematical symbols from the statements of the questions into your solution. This document was created using the Arial Unicode font.
* These homework problems are proprietary to SNHU COCE. They may not be posted on any non-SNHU website.
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1. Let A = {1, 2, 3, 4} and R be a relation on the set A defined by:

R = {(1, 1), (1, 2), (1, 4), (2, 1), (2, 2), (4, 1), (4, 4)}

Determine whether R is reflexive, irreflexive, symmetric, asymmetric, antisymmetric, or transitive. For each property, either explain why R has that property or give an example showing why it does not.

Reflexive: No, because (3, 3) is not in R.

Irreflexive: No, because (1, 1), (2, 2), and (4, 4) are in R.

Symmetric: Yes, because for every (a, b) in the set of R, (b, a) also exists.

Asymmetric: No, because R is symmetric.

Antisymmetric: No, because while, for example, (1, 2) and (2, 1) are in R, 1 does not equal 2.

Transitive: No, because while we have (4, 1) and (1, 2) in our set, (4, 2) does not exist.

1. Suppose an online retailer identifies each member with a 7-digit account number. Define the hashing function h*,* which takes the first 4 digits of an account number as one number and the last 3 digits as another number, adds them, and then applies the mod-67 function.
   1. How many linked lists does this create?
   2. Compute h(5716379).
   3. Computer h(3842137).
2. 67
3. 65
4. 26
5. Let A = {1, 3, 5, 15, 18} and R be defined by xRy if and only if x|y. You may copy/paste/move/resize the images below as needed for your digraph and Hasse diagram.
   1. Draw the digraph of A.
   2. Draw the Hasse diagram of A.
   3. Give a subset of B that is linearly ordered and contains at least three elements.
7. B = {1, 3, 18}
8. Use the following algebraic expression for this problem. You may copy/paste/move/resize the images below as needed for your graph.

3(m + 6) – 5(n – 2)

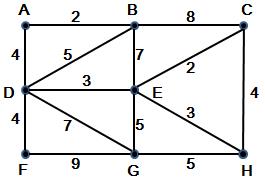
* 1. Construct the tree of this algebraic expression.
  2. Show the results of performing a postorder search of the tree.
  3. Evaluate this postorder search expression when m = 4 and n = 7 and list each step of the solution.

1. First, we would add 4 + 6 = 10, then 3 \* 10 = 30

Moving to the right side of the equation, 7 – 2 = 5, then 5 \* 5 = 25

Finally 30 – 25 = 5

1. With vertex A as the initial vertex, use Prim’s algorithm to find a minimal spanning tree for the following diagram. You do not need to draw the tree, but do list the edges (as ordered pairs) in the order in which you chose them. What is the total weight of your minimal spanning tree?



Total weight: 23

1. Use Fleury’s algorithm to produce an Euler circuit for the following graph. Start at A and label the edges in the order that you add them.

